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GEOGRAPHIC SCHOOL BULLETINS

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PALERMO'S FIGHTING PAST REVIVES WHEN A PUPPETEER PULLS THE STRINGS

Puppet shows long have been a popular pastime in Sicily's metropolis, Palermo.

Favorite plots for puppets are garbled romances based on the island's fantastic history. Because of its geographic position as the stopper in the central bottleneck of the Mediterranean, exposed to conquest from east or west, medieval Sicily fell prey to Saracens and Normans. Normans made a spectacular entry into Sicilian history in 1061, when 700 Normans routed 20 times as many Saracen warriors; eight and a half centuries later the hero puppet is frequently a Norman, perhaps with such a historic name as Tancred or Roger.

Now American soldiers may be able to see Palermo's puppet knights in miniature armor fight duels, rout the Saracen, and get kicked in the stomach by a puppet donkey. In Sicily and other battle theaters the local marionettes are showing Americans what their allies love and laugh at (Bulletin No. 4).

Melville Chater

GEOGRAPHIC SCHOOL BULLETIN

HOW TEACHERS MAY OBTAIN THE BULLETINS

The Geographic School Bulletins are published weekly throughout the school year (thirty issues) and will be mailed to teachers in the United States and its possessions for one year upon receipt of 25 cents (stamps or money order); in Canada, 50 cents. Originally entered as second-class matter January 27, 1922; re-entered as of April 27, 1943, Post Office, Washington, D. C., under Act of March 3, 1879. Copyright, 1944, by National Geographic Society, Washington, D. C. International copyright secured. All rights reserved. Quedan reservados todos los derechos.

East Prussia Was Germany's Stronghold of Junker Militarism

RUSSIAN armies storming into East Prussia have broken into the stronghold of some of Germany's most warlike traditions.

East Prussia was the boyhood home of General von Hindenburg. It was the site of the last stand of Germany's Junkers, the militaristic landed aristocrats who were able to hold on to their feudal rights until a hundred years ago. Serfdom was not abolished until the middle of the 19th century. Since then, the Junkers have continued to be a force for reaction in Germany, although their power was somewhat curtailed by the World War I overthrow of the German Empire and later by the Nazis. This region is part of Prussia, long Germany's largest and most powerful state, the one which unified the German Empire and gave it the Hohenzollern emperors. So dominant is Prussia's militarism that the very word has come to denote arrogance, ruthless discipline, and brutal conquest.

Center for Nazi Agitation

East Prussia is about twice the size of New Jersey, with a prewar population of about two and a half millions.

Fronting on the Baltic Sea, northeast of the bulk of Germany, the region is an island of German territory. It was separated from the rest of Prussia and Germany when the Polish Corridor was created after World War I in 1919 (illustration, next page). It then became entirely surrounded by foreign land—Lithuania on the northeast, the U.S.S.R. and Poland on the south and west, and—until 1939—the Free City of Danzig on the northwest.

This crowded corner of the Baltic is one of Europe's perennial trouble spots. During the rise of National Socialism, the Nazis chose East Prussia as a laboratory for developing and testing their ideas. They gathered followers and prestige by creating jobs in this area, which, handicapped by vast estates and poor soil, had a severe unemployment problem. They worked toward conquest by seeking to recover territory around East Prussia which Germany had lost to Poland and Lithuania after World War I. They agitated for land to the northeast around Memel; Lithuania ceded it in March, 1939, thus losing her only good port. The territory to the west, around Danzig, had been so overwhelmed politically by the Nazis that it returned to the Reich on the first day of the war, September 1, 1939. The invasion of Poland put an end to the Polish Corridor.

Lakes in the South and Lagoons in the North

Russian occupation of eastern Poland, in September, 1939, brought Soviet authority to the southeast boundary of East Prussia. Then the Nazi attack on the Soviet Union, in 1941, drove the Russians far away from German soil.

Now, with the Russians probing into this eastern outpost of Germany, East Prussia offers a possible route into northern Germany and Berlin. The western boundary of the separated Prussian province is only 230 air miles from the German capital. Two main railways lead through East Prussia to Berlin.

East Prussia consists in the north of rolling plains, fringed with coastal dunes. In the south, it rises into a plateau, with some hills over 1,000 feet high. Chief physical features of the south are the many lakes and swamps, gouged out by glaciers which once covered the country. The coast is marked by two large sea lagoons, the Frisches Haff in the west and the Kurisches Haff in the east, sepa-

UMI

Emil P. Albrecht

PERUGIA'S VEGETABLE VENDERS SET UP SHOP IN THE SHADOW OF JUSTICE

The pushcarts and awninged stalls of Perugia's produce market display bright-colored fruits and vegetables in the shadow of a grim Renaissance palace. The stone balcony which juts from the wall gives slight shelter to the flimsy square awning beneath. This massive stone building, erected in the latter part of the 15th century during Perugia's greatest glory, walls the eastern side of the square now known as the Piazza Garibaldi. With the adjoining Old University, the *palazzo* now houses Perugia's courts of justice. Remains of ancient Etruscan walls form part of the foundation of this long, narrow stone-paved square. Fighting Yanks in this region of central Italy are finding Perugia one of the little-mentioned towns whose sons have been heard of abroad (Bulletin No. 3).

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Antwerp Gives Allies One of World's Greatest Ports

THE fall of Antwerp brought Belgium's world port and second-largest city under Allied control. The city is located on the right bank of the Schelde River about 50 miles inland from the North Sea (measured from the outer mouth of the estuary).

It is the only seaport in the country large enough to permit the Allies to berth big supply ships carrying food, munitions, and other materiel to armies on the continent. During World War I German forces long held this strategically located port.

In prewar days Antwerp's 18 miles of stone wharves and quays hummed with activity (illustration, next page). It was then the distributing point for Belgium, Alsace, Lorraine, Switzerland, and part of Germany. The city, while second in size to Brussels, was nevertheless foremost in international trade. Although its industries included brewing, distilling, diamond cutting, and sugar refining, it was in the field of commerce that Antwerp held undisputed sway.

What Antwerp Owes to the Schelde

By a series of locks and canals, the naturally well developed harbor was further improved during the past century and a half. Antwerp increased its maritime prominence until the outbreak of World War I, when its commerce was as great as that of any port on the European continent. Shortly before the present war, it ranked as one of the world's busiest ports. With Hamburg and Rotterdam it was among the leading three on the European continent.

"The Antwerper owes the Schelde to God," runs an old Belgian proverb, "and all else to the Schelde."

Before the second World War engulfed Antwerp, it had a population of more than 270,000. A few of its wealthy citizens lived in palatial homes fronting wide, poplar-bordered boulevards that have replaced the city's old fortifications. Others lived in the ancient part of town, where some of the old sharp-gabled buildings are reminiscent of the years when Antwerp was an important city of the Hanseatic League. In fact, the majority of Antwerpers lived in comfortable houses, for in the "City of Wealthy Men," as Antwerp has frequently been called, there was little surface indication of poverty before the war.

Once Second in Size Only to Paris

The skyline of Antwerp is dominated by the slender Gothic tower of Notre Dame Cathedral and a modern 24-story skyscraper. Other famous buildings in the city are the old, richly decorated town hall; the Stock Exchange building (the first on the European continent); the old Steen, now a museum; the former home of Christophe Plantin, famous printer of the 16th century; and numerous art galleries housing the masterpieces of Rubens, Van Dyck, and others. The Flemish painter Rubens made his home in the city.

Antwerp, whose founding probably goes back to the 8th century, has experienced troublesome days in the course of its history. By the middle of the 16th century it was, next to Paris, the largest city in Europe. It then held the purse strings of the continent. In 1576 it was burned and pillaged by the Spanish when the Antwerpers revolted against Spanish rule. Later, Napoleon helped restore its commercial importance.

UMI

rated from the Baltic by narrow strings of sand dunes.

East Prussia's chief crop is potatoes. This is Germany's best potato country. Rye, oats, and flax also grow. The forests of the south supply timber.

Russians Invaded East Prussia in World War I

The province's capital and leading city is Königsberg, on the north-central coast. It had a population in 1939 of nearly 370,000. Tilsit, Elbing, and Insterburg are other important East Prussian cities.

Early in the first World War, Allied strategy called for the invasion of East Prussia by the Russians in order to draw German troops away from the hard-pressed Western Front. The Russian forces were making considerable progress until the disastrous battle near Tannenberg, in the southwest part of the province. There an apparent German defeat was turned into victory under the leadership of General von Hindenburg. The general was buried beneath the Tannenberg Memorial when he died in 1934.

The Germans were especially jubilant over the Tannenberg victory, since it occurred on the site of a signal defeat suffered more than 500 years before, of invading Teutonic Knights at the hands of Polish and Lithuanian forces. These Teutonic Knights in 1230 had started the campaign to Christianize and Germanize East Prussia which won the area for Germany.

Note: East Prussia is shown on the National Geographic Society's Map of Germany and Its Approaches. A price list of maps may be obtained from the headquarters of the Society, Washington 6, D. C.

See also "Königsberg, Bombed by Russians, Is World's Amber Capital" (Geo-Graphic Brevity), in the GEOGRAPHIC SCHOOL BULLETINS, May 3, 1943.

Bulletin No. 1, November 13, 1944.

A THREE-SIDED POST MARKS THE MEETING OF THREE STATES ON THE BOUNDARY THAT MADE EAST PRUSSIA EAST

The boundary by which the Polish Corridor separated East Prussia from West Prussia was established by the Versailles Treaty on June 28, 1919, as the date on the marker indicates. This province was set apart from the rest of Germany for the purpose of giving landlocked Poland a seaward corridor to a port. Also set off from German territory was the Free City of Danzig, which by terms of the treaty was self-governing under the supervision of the League of Nations. The three-cornered marker indicates the spot where Danzig's wedge of territory squeezes between East Prussia and Poland and its southernmost tip touches the Polish-Prussian frontier. A chain marks the Reichsgrenze, or international frontier of the German Reich (sign, left). Germany attempted to wipe out these boundaries in September, 1939, by annexing Danzig and invading Poland. The flat country is typical of East Prussia's lowlands.

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Italian Home Towns of Headliners

AS ALLIED armies push the Germans northward in Italy, the fighting Yanks may see three inconspicuous ancient cities which have one common characteristic. Each of the three was the home town of a boy whose name made news—a scientist, a painter, and a politician. Perugia lent its name to the 16th century painter, Perugino; Faenza was the birthplace of Torricelli, inventor of the barometer; while Forli may wish to forget that it was the home town of Mussolini.

Perugia Lent Its Name to Painter Perugino

Perugia, 80 miles north of Rome, is one of the oldest of the hill towns of central Italy. It has a commanding site on a rocky ridge, 1,000 feet above the fertile Umbria plain, just west of the Tiber (illustration, next page).

The city is on a branch line that ties in with the main railway between Rome and Florence (Firenze). It is also a junction for highways. Perugia's prewar population was about 82,000. Its industries produced lace, jewelry, and pottery.

Massive remains of Etruscan and Roman walls and gateways, of medieval and Renaissance buildings still stand in the city (illustration, inside cover).

During medieval struggles between city states, Perugia conquered and ruled over neighboring regions. In intervals between conflicts it maintained its reputation for violence and bloodshed by internal political strife.

Perugia was a center of the Umbrian school of painting in the 15th century. Pietro Vannucci, born about 1450 in a near-by town, was sent to Perugia when he was 9 years old and apprenticed to a painter to study art. From the city he took the name which he made famous—Perugino. He greatly influenced the early work of Raphael, who came to study under him at the age of 12.

Perugia has been called the capital of the Fascist Revolution. It was headquarters of Fascist leaders who organized the "march on Rome" in 1922 that brought Mussolini to power.

Faenza Was the Birthplace of Torricelli

If U. S. Army weather experts pass through Faenza on the road to Bologna, they may well salute a statue in its public square, that of Evangelista Torricelli, 17th century physicist. He invented the barometer, probably the weather man's most valuable single instrument. It gauges the changing pressures of the earth's atmosphere which foretell changes of wind and weather.

Faenza is 35 miles northwest of the Adriatic port of Rimini, about midway between the latter city and Bologna on the Po valley railroad. A rail line from Faenza runs southwest through the Apennines to Florence.

An ancient walled town, Faenza still shows traces of the rectangular city plan of the Romans. It had a prewar population of about 25,000.

The word "faience," now applied to many types of glazed pottery, originally designated a fine kind of glazed and painted earthenware made in France in the 16th century by potters from Faenza. These Italian potters had copied a kind of Valencia pottery brought to Italy in Majorcan trading vessels and called "majolica" from the mistaken idea that it was made on the island of Majorca.

Faenza has been a pottery center for five centuries. Before the war it had a school of ceramics as well as an International Museum of Ceramics which had an extensive collection of pottery from many countries and of many periods.

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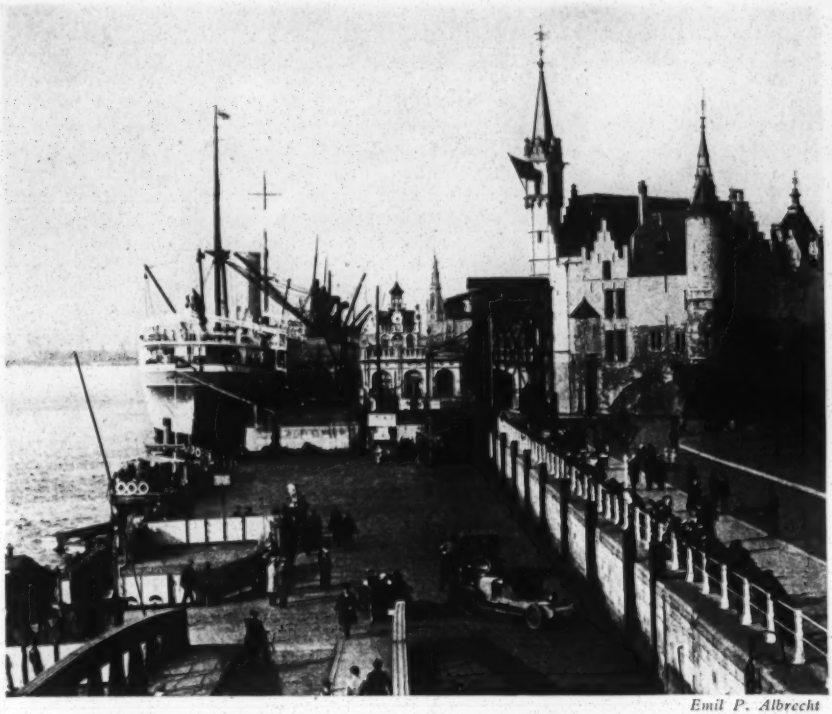
In 1830, when Belgium separated from the Netherlands, the city lost control of the mouth of the Schelde River to the latter country. The Antwerpers were forced to pay heavy tolls on all incoming and departing vessels. In 1863, the Belgian government paid the Netherlands more than three million dollars for rights freely to use the river, whose mouth is in Netherlands territory, and this ended the old controversy.

Note: Antwerp appears on the Society's Map of Europe and the Near East.

See also "Belgium—Europe in Miniature," in the *National Geographic Magazine* for April, 1938*; "Through the Back Doors of Belgium," May, 1925; and "Singing Towers of Holland and Belgium," March, 1925. *(Issues marked with an asterisk are included in a special list of Magazines available in lots of ten for $1.00 to teachers and librarians.)*

"Belgian Portraits," a series of 20 natural-color photographs, identical with those appearing in the April, 1938, issue of the *Magazine*, are available as separate color sheets for school use. (A subject list of color sheets available in packets of 48 and 96 will be sent if requested from the Society's headquarters, Washington 6, D. C.)

Bulletin No. 2, November 13, 1944.



Emil P. Albrecht

BIG SHIPS AND BIG DOCKS MAKE ANTWERP BELGIUM'S FUNNEL

Because a canal and railway network converge at the port beside the Schelde, Antwerp has long been a shipping center for Belgium. Napoleon, intent on competing with British shipping, helped the port in its slow growth to international importance. Trade with the Belgian Congo gave ship traffic a boost and also supplied raw materials which permitted Antwerp to become an industrial city of consequence. The quays stretching for miles along the right bank of the Schelde were begun 65 years ago. The largest ships were able to dock there before the war. Their construction makes allowance for the 14-foot difference in water level between high and low tides. Before the war several hundred cranes lined the docks to speed unloading (center, beside ship). This quay (foreground, left) bears the name of Van Dyck, whose paintings were prominent among Antwerp's treasures of Flemish art. Looking down on the docks are the Promenoirs, the sidewalks where peacetime Antwerpers used to stroll for summer breezes and winter sun. Beside the Quai Van Dyck rises the many-towered structure of the ancient Steen, last surviving part of a 10th-century castle; most of the present structure is not more than 420 years old. Once it was a prison, but modern Antwerp made it a museum.

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Puppets Reveal Strange Nations to Yanks Abroad

IF YOUR stalwart soldier abroad writes that he is developing an interest in puppets, don't fear that he is entering his second childhood. Americans who have rarely seen even a simple performance of Punch and Judy are surprised to learn of the popularity and real entertainment value of puppets and marionettes in Sicily, Italy, Belgium, England, and France.

As the American forces move into new theaters, they will find that the hand-manipulated, talking dolls have a strong hold on people's imagination throughout Europe and Asia. For puppets are the popular equivalent of Mickey Mouse and Superman, the animated cartoon movie and the comic strip, in such lands as Sicily, Greece, and Italy, China, Japan, and the Netherland Indies. Elsewhere, as in England, France, Austria, Czechoslovakia, and the U.S.S.R., they are a fairly sophicated branch of the theatrical arts.

Palermo a Puppet Stronghold

Wherever they are encountered, the local marionettes are helping the American soldier to overcome a language barrier and to understand the people. They give him a clue to a nation's history, its heroes, and its sense of humor.

Puppet shows are old. China and India are both credited with their invention. India has this evidence of priority: the word for stage manager in Sanskrit was "thread-holder," and the puppeteer holds the threads that move the marionettes over their small stage. Java had its special puppet plays (illustration, next page) long before conquerors brought a foreign culture.

On the island of Sicily the movies never have won the people away from their beloved marionettes. In Palermo the Teatrino dei Piccoli (Little Theater for Little Folk) has presented puppet dramas handed down from father to son through centuries (illustration, cover). Often the miniature theater tells episodes of its stories serially in one performance after another, like the serials of American movies. "Charlemagne and the Twelve Paladins" has been known to run serially for a year in the Sicilian metropolis before the final episode. In Naples, Milan, and other Italian cities puppet serials have run for months, with audiences applauding each sword thrust and hissing the villain.

Italy is the homeland of that most familiar puppet, poor homely Punch, whose misadventures with his wife Judy and his dog Toby entertained Europeans and Americans for several centuries, before Hollywood went into action.

Like Pioneers, French Puppets Rode in Covered Wagons

Back in the 16th century, puppet shows were known to Londoners as "motions" and were so referred to by Shakespeare and Ben Johnson. Puppet shows in England had their greatest development under Cromwell, when the Puritans banned other theatrical performances. Many actors then became puppeteers.

Paris had puppet shows as early as the days of Louis XIV. Puppeteers toured the French provinces in covered wagons before the war, presenting Punch and Judy performances within the wagons for street audiences. Puppet shows in prewar Paris, not limited to Punch and Judy, had scores of parts and dozens of plots, with performances for youngsters in the Tuileries Gardens, and for their elders in the Grand Guignol in Rue Chaptal.

In pre-Nazi Germany especially, and even in grimmer later years, puppetry

UMI

Forli Was Mussolini's Home Town

Forli, on the southern edge of the Po valley, 30 miles northwest of Rimini, has the dubious distinction of being the home town of Benito Mussolini. He was born at the near-by village of Predáppio Nuova (Dovia), where his father was a blacksmith. At Forli, where the senior Mussolini owned a tavern, his son attended —and was expelled from—school.

It was in the Forli library, after this end to his formal education, that Mussolini continued his studies under the direction of his schoolteacher-mother. At Forli he edited his first paper. He served a jail sentence there in the castle of Catherine Sforza, a 15th century ruler of the city. In Forli's great square Mussolini aroused the revolutionary spirit of the Black Shirts. In his father's tavern he met the waitress, Rachele, who became his bride.

Forli has a population of 65,000. It is on an ancient Roman road, and on a railway which connects Rimini with Milan. The city is dominated by the 14th century Campanile of San Mercuriale, a bell tower rising 248 feet.

Note: Italy is shown on the Society's Map of Central Europe and the Mediterranean, and on the Map of Classical Lands of the Mediterranean, which notes ancient and modern names.

See also: "Italy, from Roman Ruins to Radio," in the *National Geographic Magazine* for March, 1940*; "Sojourning in the Italy of Today," September, 1936*; and "Holidays among the Hill Towns of Umbria and Tuscany," April, 1928*.

Bulletin No. 3, November 13, 1944.

Burton Holmes from Galloway

PERUGIA'S ROOFS REPEAT THE EXAMPLE OF ITS STEPPED STREETS

Perugia, stairstep city of central Italy's hill region, has few level spots. It is built on the summits and radiating spurs of a group of hills. Parks and plazas are often on made ground, supported by masonry the Etruscans built before Rome was born. Between the crowding houses some narrow streets are actual stairways up steep slopes; others are ramps. Tile roofs rise tier on tier, repeating the pattern of the stepping byways below. A viaduct (center background) provides a short cut from hilltop to hilltop.

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Geo-Graphic Brevities

LEYTE, FIRST STEPPINGSTONE TOWARD MANILA

LEYTE Island, in the central Philippines, was chosen by United States forces as their first Philippine steppingstone to Manila. Names of places on the island and waters in the vicinity became familiar to news readers during the landings and the big naval battle that ensued.

Leyte lies about midway between the islands of Luzon and Mindanao. It ranks eighth in size among the 7,083 islands of the group. It is more than twice as big as the State of Rhode Island. Its prewar population was about 358,000.

Tacloban, capital and chief port of Leyte, lies on a narrow peninsula projecting into San Pedro Bay, northwestern bulge of Leyte Gulf. The city had a prewar population of about 32,000.

North of Tacloban the narrow Strait of San Juanico cuts a passage from Leyte Gulf to the Samar Sea, and separates Leyte from the island of Samar, second big steppingstone on the return trip through the Philippines to Manila.

Of the three initial beachheads, the northernmost was between the small towns of San Ricardo and Palo, just south of Tacloban. Another landing was made at Dulag, 19 miles south of Tacloban. A town of about 5,000 people, Dulag before the war was a shipping point for copra. A third landing was made on the small island of Panaon, off the southern tip of Leyte.

Leyte is about 120 miles long. Its central width is narrowed to 15 miles by the inward curves of Leyte Gulf on the east and the Camotes Sea on the west. Forested mountains ridge the interior, rising to 4,400-foot Mt. Lobi in the north. Some of them are extinct volcanoes. The island's numerous streams have served more for irrigation than for transportation. The largest rivers are in the north, among them the Marabang, the Spaniton, and the Naga.

In spite of typhoons, which occasionally do much damage, Leyte is one of the best cultivated of the Philippines. Cotton, sugar, coffee, rice, and corn grow. There are coconut groves, producing copra, and extensive abacá plantations which supply the valuable fiber, "Manila hemp," for rope and cables. From the forests comes a kind of rosin called dammar. Small ships were built at Tacloban.

Mineral wealth includes gold, silver, lead, iron, and sulphur. Leyte's sulphur mines supplied Manila's gunpowder works in the days of Spanish rule.

Highways connect the north and east sections of the island with the southwestern coast. A network of roads links the towns in the vicinity of Tacloban.

Note: Leyte may be located on the Society's Map of Southeast Asia.

For additional information about the Philippines, see "Facts about the Philippines," in the February, 1942*, issue of the *National Geographic Magazine;* "Return to Manila," October, 1940*; and "Unexplored Philippines from the Air," September, 1930*; and these GEOGRAPHIC SCHOOL BULLETINS: "New War Chapter Opens in the Philippines," November 6, 1944; "Mindanao, a Southern Outpost of the Philippines," October 23, 1944; and "Luzon, Largest of the Philippines," January 12, 1942.

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WOLFRAM, SOURCE OF STEEL-TOUGHENING TUNGSTEN

WOLFRAM is so war-important that Allied diplomacy has tried to halt or curtail its shipment to Germany from Spain and Portugal (Europe's leading producers of the ore). It is an ore containing tungsten, manganese, and iron.

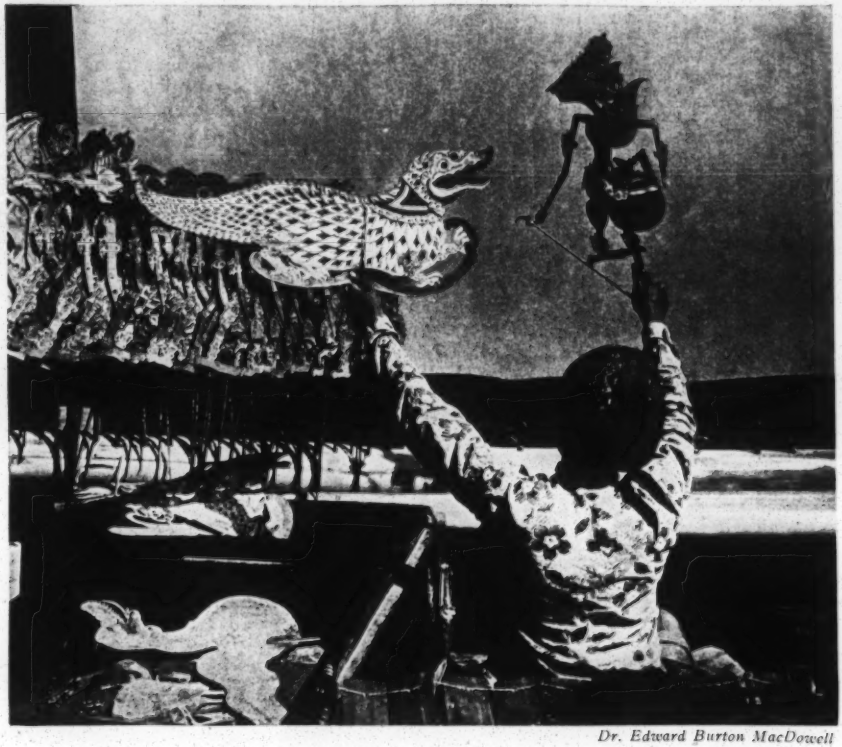
UMI

was particularly popular, with theaters in Berlin, Leipzig, Dresden, and other cities. In 1936 the "company" from Fritz Gerhard's Marionette Theater in Wuppertal had a long and successful run in one of Berlin's theaters. Harro Siegel's Berlin puppets performed in Denmark, toured England, gave Handel's "Dido and Aeneas" in Cambridge. Other puppet shows regularly toured Germany, and appeared at fairs in the remotest villages of Saxony and Bavaria.

Pre-Nazi Austria developed nimble-fingered puppeteers who entertained audiences as far east as Moscow, though the Russians had their own marionette theaters. In Salzburg one might have seen a marionette performance of "Faust," a puppet six-year-old Mozart playing the piano at the Court of the Kaiserin, or a doll Anna Pavlova in the dance of "The Dying Swan."

Before the war, puppeteers of all nations were associated in the International Federation of Puppeteers, which had its headquarters in Prague, Czechoslovakia.

Bulletin No. 4, November 13, 1944.



Dr. Edward Burton MacDowell

STICKS, NOT STRING, JERK THE JAVANESE PUPPET INTO JUMPY ACTION

The *wayang* plays of Java are slow-moving puppet pageants consisting of a series of dance-like postures. The puppets are made to move their long thin arms in jerks by pushing sticks rather than by pulling strings; the puppeteer, or *dalang*, with one hand can manipulate the two sticks that will make this puppet hero stab the menacing dragon. The *dalang* speaks for all the puppets and roars and snorts for the dragons. The puppets may be flat, cut from stiff buffalo hide, or round, carved from wood. One explanation of their fantastic appearance is that ancient *dalangs* designed them that way to evade the Moslem ban on copying the human figure. Instead of a stage, Java's mimic theater uses a pole of soft wood, into which the puppets—mounted on spikes—are stuck. The *dalang* brings his doll-actors to the performance in a coffin-like wooden box (left foreground). The drama, based on ancient legends, is accompanied by a *gamelan*, or orchestra of instruments like a xylophone (right foreground). Sometimes an audience of men may watch the performance of gilded and painted puppets in front of the screen, while women watch from the rear; to the latter, the technicolor performance is merely a shadow show in black and white.

Wolfram, or wolframite as it is also called, is the chief source of tungsten, although the metal is also obtained from other ores such as scheelite.

Tungsten is extremely valuable as a hardener for steel to make armor plate, guns, and armor-piercing projectiles. Tungsten steel is used in high-speed cutting tools and hard dies, and in such widely assorted articles as railway car springs, watch springs, piano strings, and razor blades. Pure tungsten forms the filaments for electric light bulbs and some radio tubes. It is used in X-ray operations, in the chemical and tanning industries, and in paints.

Before the war, the United States obtained tungsten ore largely from China, the world's leading wolfram producer (illustration, below). When war blocked China's export of the ore, Uncle Sam turned to Latin America for tungsten. Bolivia, Argentina, Peru, Mexico, Brazil, and Chile are the major American sources. Tin-producing Bolivia leads in output, since wolframite often occurs with tin ore. New processes now obtain increased amounts of both tungsten and tin from complex Bolivian ore, making use of what was once discarded as useless residue.

Note: Additional information about wolframite is included in the article, "Metal Sinews of Strength," in the *National Geographic Magazine* for April, 1942*; and "Strategic Materials: No. 3, Tungsten Can Take It," in the GEOGRAPHIC SCHOOL BULLETINS, April 12, 1941.

Bulletin No. 5, November 13, 1944.

AP from Press Association, Inc.

METAL MORE USEFUL THAN GOLD HIDES ITS LIGHT IN A BUSHEL BAG

Only the Chinese markings on these burlap bags make them look more unusual than so many bushels of grain or a heap of lowly sandbags. But their dingy surface hides wolfram, an ore which contains tungsten—a metal more precious than gold because it is essential to national defense, while gold is not. The Chinese characters indicate that this shipment of wolfram came from China's southern province of Kwantung. Before the war cut down China's exports, millions of dollars' worth of this ore crossed the ocean to United States steel plants. In 1940 Uncle Sam made a $25,000,000 loan to China with that nation's tungsten as security. Wolfram is scarce in the United States, and the tungsten it holds is indispensable in hardening steel for many uses of both war and peace.

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